MA.3.NSO.1.2

Overarching Standard: **MA.3.NSO.1** *Understand place value of four-digit numbers*

Benchmark of Focus

MA.3.NSO.1.2 Compose and decompose four-digit numbers in multiple ways using thousands, hundreds, tens and ones. Demonstrate each composition or decomposition using objects, drawings and expressions or equations

Examples: The number 5,783 can be expressed as 5 thousands + 7 hundreds + 8 tens + 3 ones or *as 56 hundreds + 183 ones.*

Related Benchmark/Horizontal Alignment

- MA.3.NSO.1.1
- MA.3.NSO.2.1

Vertical Alignment

Previous Benchmarks	Next Benchmarks
• MA.2.NSO.1.2	• MA.4.NSO.1.1 • MA.4.NSO.1.2

Terms from the K-12 Glossary

- expression
- whole numbers

Purpose and Instructional Strategies

The purpose of this benchmark is for students to identify ways numbers can be written flexibly using decomposition. In addition to students knowing that number sense and computational understanding is built on a firm understanding of place value. This work extends from the Grade 2 expectation to compose and decompose three-digit numbers in multiple ways using hundreds, tens and ones (MA.2.NSO.1.2).

- Multiple representations of multi-digit whole numbers allow students to identify opportunities for regrouping while adding and subtracting. For example, when subtracting 5,783 – 892, we can represent 5,783 as 5 *thousands* + 6 *hundreds* + 18 *tens* + 3 *ones* by regrouping 1 *hundred* as 10 *tens*, allowing us to subtract 9 *tens* (K12.MTR.2.1, K12.MTR.3.1).
- Students should use objects (e.g., base ten blocks), drawings, and expressions or equations side-by-side to see compare and contrast the representations. Model to

show how multiple representations relate to the original number. For example, use base ten blocks to show how in the number 5,783, 1 *hundred* can be regrouped as 10 *tens* to express it as 5 *thousands* + 6 *hundreds* + 18 *tens* + 3 *ones*, while asking students how they are the same (K12.MTR.2.1).

- Allow students to decompose numbers in as many ways as possible. Have students compare and contrast the representations shared (K12.MTR.4.1).
- Students should see examples of numbers within 10,000 where zero is a digit and make sense of its value.
- Flexibility of place value is a prerequisite for conceptual understanding of a standard algorithm for addition and subtraction with regrouping

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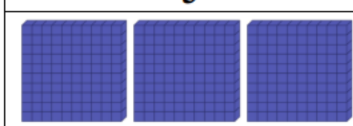
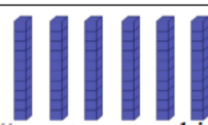
Common Misconceptions or Errors

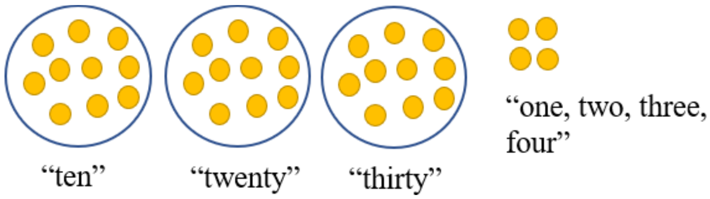
- Students can misunderstand that the 5 in 57 represents 5, not 50 or 5 *tens*. Students need practice with representing two and three-digit numbers with manipulatives that group (base ten blocks) and those that do NOT group, such as counters, etc.
- Students can misunderstand that when decomposing a number in multiple ways, the value of the number does not change. 879 is the same as 87 *tens* + 9 *ones and* 8 *hundreds* + 79 *ones*

Strategies to Support Tiered Instruction

- Instruction includes decomposing numbers using manipulatives that group (base ten blocks) and those that do not group such as counters. When decomposing a number, students focus on the value of each digit based on its place value. To reinforce this concept, students may count by units based on the place value.
    - For example, decompose 362 using base ten blocks and explain the value of each digit.

3	**6**	**2**
 "one hundred, two hundreds, three hundreds"	 "ten, twenty, thirty, forty, fifty, sixty"	 "one, two"
3 hundreds	6 tens	2 ones
300	60	2

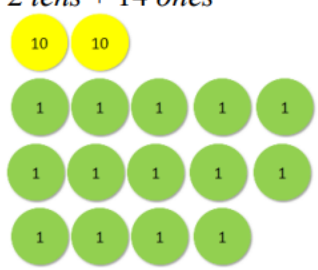
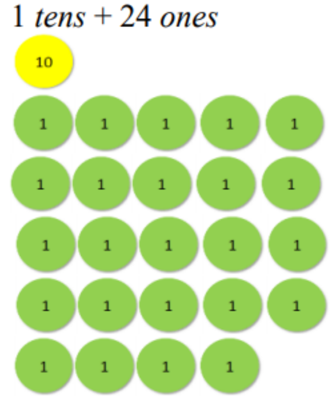
    - For example, represent 34 using counters and explain the value of each digit. Students group 10 ones as a group of ten and focus on the value of each digit based on its place value. To reinforce this concept, students count by units based on the place value.



- Teacher provides opportunities to decompose numbers in multiple ways using manipulatives and a chart to organize their thinking and asks students to name/identify the different ways to name the values (regrouping the hundreds into tens and the tens into the ones, e.g., 36 tens and 2 ones or 3 hundreds and 62 ones, etc.)
  - For example, students decompose 362 in multiple ways using hundreds, tens, and ones.

362			
	Example 1	**Example 2**	**Example 3**
Ones only	362 *ones*		
Tens and ones	36 *tens* + 2 *ones*	35 *tens* + 12 *ones*	29 *tens* + 72 *ones*
Hundreds and ones	3 *hundreds* + 62 *ones*	2 *hundreds* + 162 *ones*	1 *hundred* + 262 *ones*
Hundreds and tens	Not applicable for this example		
Hundreds, tens and ones	3 *hundreds* + 6 *tens* + 2 *ones*	2 *hundreds* + 15 *tens* + 12 *ones*	1 *hundred* + 24 *tens* + 22 *ones*

  - For example. Students decompose 34 in multiply ways using tens and ones.

34			
Tens and ones	3 *tens* + 4 *ones* 	2 *tens* + 14 *ones* 	1 *tens* + 24 *ones* 

Questions to ask students:

How can a base ten model help us represent a number in expanded form?

- Students should be able to explain that a base ten model helps us physically with manipulatives or in a picture show how much is in each place value. By taking the model further and labeling the values being modeled, students can say if you were to add all the place values together, you will get the given number being represented.

Does the value of the number change when it is represented in different ways?

- Students should be able to explain that the value of the number does not change when it is shown in different ways. They should be able to explain and make connections between different forms and models by labeling the values and recognizing that the same number is being represented in different ways.

How many tens or ones make the number 325? (or any other number you choose to use)

- Students should be able to say that if they were only given ones they would need 325, this can be related to counting by ones. If they were only given tens to represent the number they would need 32 tens and 5 ones, this can be related to counting by tens.

How does place value relate to expanded form?

- Students should be able to explain that by knowing the place value of each digit, it helps them understand what the value will be when expanding the number. For example, *when working with the number 618, If I know that the digit in the hundreds place is 6 then I know that there are 6 one hundreds of 600.*

How can you decompose 4,397 in different ways?

- Sample answer that demonstrates understanding: *4,397 can be represented as 4 thousands, 3 hundreds, 9 hundreds, 7 ones or 43 hundreds and 97 ones or 4 thousands and 397 ones or any other combination that represents 4,397.*

Instructional Tasks

Instructional Task 1

Express the number 5,783 using only thousands and ones.

Instructional Task 2

Express the number 5,783 using only hundreds and ones.

Instructional Task 3

Express the number 5,783 using only tens and ones.

Instructional Items

Instructional Item 1

Select all the ways that express the number 8,709.

a. 8,000 + 600 + 19
b. 8,000 + 700 + 9
c. 879 ones
d. 8 thousands + 6 hundreds + 10 tens + 9 ones
e. 8 thousands + 7 tens + 9 ones

Achievement Level Descriptors

<table>
<tr><th colspan="2">Benchmark</th><th>Context</th><th>Assessment Limits</th></tr>
<tr><td colspan="2">MA.3.NSO.1.2 Compose and decompose four-digit numbers in multiple ways using thousands, hundreds, tens and ones. Demonstrate each composition or decomposition using objects, drawings and expressions or equations.
Example: The number 5,783 can be expressed as 5 thousands + 7 hundreds + 8 tens + 3 ones or as 56 hundreds + 183 ones.</td><td>Mathematical</td><td>N/A</td></tr>
<tr><th>ALD 2</th><th>ALD 3</th><th>ALD 4</th><th>ALD 5</th></tr>
<tr><td>composes four-digit numbers in multiple ways using thousands, hundreds, tens, and ones; demonstrates each composition using objects or drawings.</td><td>composes four-digit numbers in multiple ways using thousands, hundreds, tens, and ones; demonstrates each composition using objects, drawings, and expressions or equations.</td><td>composes and decomposes four-digit numbers in multiple ways using thousands, hundreds, tens, and ones; demonstrates each composition or decomposition using objects, drawings, and expressions or equations.</td><td>identifies an error; composes and decomposes four-digit numbers in multiple ways using thousands, hundreds, tens, and ones; demonstrates and explains each composition or decomposition.</td></tr>
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Additional Resources:

CPALMS

How to Write Numbers in Expanded Form

Using Place Value Blocks to Make Numbers

Expanded Form Worksheet

Resources/Tasks to Support Your Child at Home:

Complete the Expanded Form Game

Create two sets of cards one stack with numbers written in standard form and the other stack with the number represented in expanded form. Use it to play a matching memory game or a version of Go Fish.